



# A new species of Andean lizard *Proctoporus* (Squamata: Gymnophthalmidae) from montane forest of the Historic Sanctuary of Machu Picchu, Peru

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**Abstract.**—We describe a new species of lizard assigned to the genus *Proctoporus* from the Historic Sanctuary of Machu Picchu in the Department of Cusco (southeastern Peru) where it inhabits a montane forest region at an elevation between 2,760–2,800 m. The new species is distinguishable from all other species of *Proctoporus* by a unique combination of morphometric, scalation, and color pattern characteristics.

**Resumen.**—Describimos una nueva especie de lagartija asignada al género *Proctoporus*, proveniente del Santuario Histórico de Machu Picchu en el Departamento del Cusco (Sureste de Perú), habita la región de bosques montanos entre los 2,760–2,800 m de altitud. La nueva especie se distingue de todas las demás especies de *Proctoporus* por la combinación única de caracteres morfométricos, escamación y características en los patrones de coloración.

**Key words.** Oriental Cordillera, Cusco, Peru, South America, Andean lizard, *Proctoporus*, Natural Protected Area, Cercosaurinae

**Palabras clave.** Cordillera Oriental, Cusco, Perú, América del Sur, Lagartija andina, *Proctoporus*, Área Natural Protegida, Cercosaurinae

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## Introduction

Gymnophthalmid lizards of the genus *Proctoporus* includes eleven species that occur in central and southern Peru, Bolivia, and northern Argentina, and an additional two unnamed species known from Peru (Doan et al. 2005; Goicoechea et al. 2012). These small, semi-fossorial lizards occur in habitats characterized by cloud forest, steppes, cacti, shrubs, and wet puna habitats along the eastern slopes of the central Andes (Doan and Castoe 2003; Doan et al. 2005). The highest diversity of the genus *Proctoporus* occurs in Peru, which includes ten species: *P. bolivianus* Werner 1910; *P. carabaya*; *P. iridescens*; *P. kiziriani* Goicoechea, Padial, Chaparro, Cas-

troviejo-Fisher, and De la Riva 2013; *P. chasqui* (Chávez et al. 2011); *P. guentheri* (Boettger 1891); *P. lacertus* (Stejneger 1913); *P. pachyurus* Tschudi 1845; *P. socalucu* Doan and Castoe 2003; and *P. unsaaca* Doan and Castoe 2003. Three species, *P. guentheri*, *P. bolivianus*, and *P. xestus* (Uzzell 1969), occur in Bolivia and one, *P. xestus*, reaches northern Argentina and probably Peru (Goicoechea et al. 2013). Taxonomic works published in this century include revisions (e.g., Doan and Castoe 2003; Doan et al. 2005; Goicoechea et al. 2012; Goicoechea et al. 2013) and the description of several new species (Doan et al. 2005; Chávez et al. 2011; Goicoechea et al. 2013). However, the actual diversity of this genus is far from known well, and new species continue to be

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found as herpetological surveys are carried out in previously unexplored or poorly known areas.

Recent biological exploration in the southern Peruvian Cordillera Oriental of the Andes has revealed the existence of a new species of gymnophthalmid lizard in the montane forest region within the national protected area of the Historic Sanctuary of Machu Picchu. The species is described herein and assigned to the genus *Proctoporus*.

## Materials and Methods

Specimens were collected by hand, euthanized with Halatal, fixed in 10% formalin, and later transferred to 70% ethanol for long-term museum storage. The specimens were deposited at the Museo de Historia Natural de la Universidad Nacional de San Antonio Abad de Cusco (MHNC) in Peru. Morphological data were obtained from preserved specimens of all known species of *Proctoporus*. Because only two specimens (one adult male and one juvenile) of *Proctoporus chasqui*, were examined, we used data from Chávez et al. (2011). Twenty-three qualitative and meristic morphological characters

(Table 1) used in previous studies on gymnophthalmid systematics were examined for 120 specimens (Appendix I). Character definition and usage follow Uzzell (1970) and Doan and Castoe (2003). Drawings were elaborate using a stereo microscope with camera lucida. Coloration in life is based on the field notes and photography by LM. Geographic coordinates were taken using a global positioning system (GPS) device and geodetic datum WGS 84.

## Results

### *Proctoporus machupicchu* sp. nov.

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Figures 1–3.

Proposed standard English name:  
**Machu Picchu Andean Lizard**

Proposed standard Spanish name:  
**Lagartija Andina de Machu Picchu**

**Table 1.** Measurements (mm) of three specimens of *Proctoporus machupicchu* sp. nov. and the addition of Fig. 3 G, specimen of subadult male not collected.

Characters (measurements mm)	MHNC13373	MHNC13362	MHNC11815	Not collected (Fig. 3 G)
	Subadult male	Adult female	Adult female	Subadult male
Snout-vent length	20.80	41.20	46.70	< 28,80
Tail length	32.30	60.82	61.40	—
Head length	8.50	10.70	11.00	—
Head width	4.80	5.80	5.70	—
Femoral pores	0	0	0	6
Supralabials	6–7 (left-right)	6	6	6
Loreal scale	PRESENT	PRESENT	PRESENT	PRESENT
Supraoculars	3	3	3	3
Genials	6	6	6	5
Postparietals (Occipitals)	3	3	3	3
Temporals	12	9	10	10
Scales around midbody	39	38	39	—
Transversal dorsal scale rows	23	22	24	—
Transversal ventral scale rows	10	10	10	10
Longitudinal dorsal scale rows	38	39	39	38
Longitudinal ventral scale rows	21	21	21	21
Lamellae under 4th finger	10	11	10	—
Lamellae under 4th toe	16	16	17	—
Postoculars	2	2	2	2
Superciliaries	4	4	4	4
Frontal	1.50	2.10	2.00	—
Frontonasal	1.50	1.95	2.10	—
Head length/Head width	1.77	1.84	1.93	—
Tail length/SVL	1.12	1.48	1.31	—
Frontal/frontonasal proportion	1.00	1.08	0.95	—

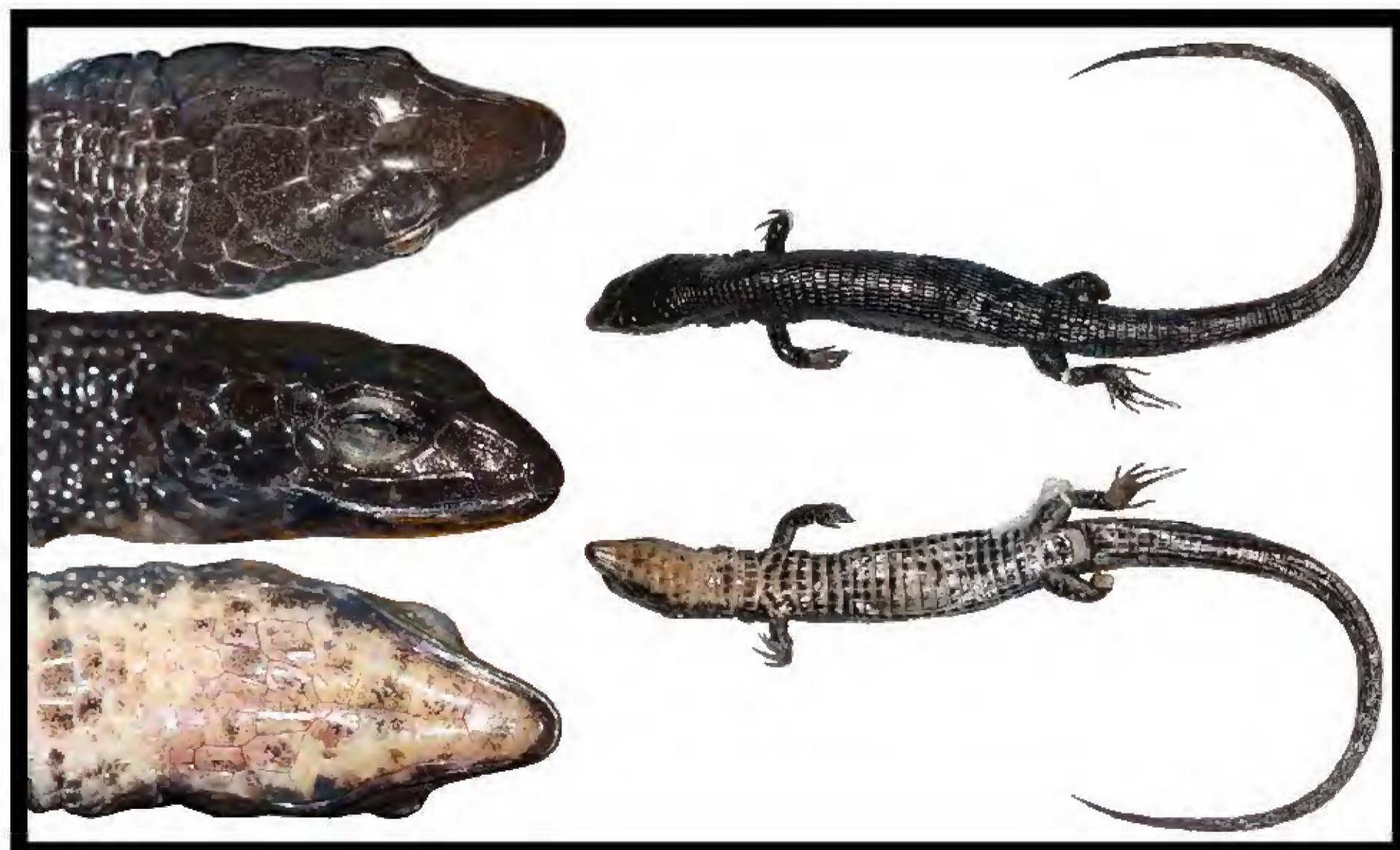
**Holotype:** (Fig. 1; 2 A–C; 3 A–B), adult female, MHNC 13362 (field number LM 834), Peru, Department of Cusco, Province Urubamba, District Machu Picchu, from Aobamba ( $13^{\circ} 14' 17''$  S;  $72^{\circ} 33' 15''$  W), 2,760 m, collected by Luis Mamani, Frank P. Condori, and Juan C. Chaparro on 16 June 2013.

**Paratypes:** MHNC 13373, field number LM 845, (Fig. 3 E–F), immature male, same data as holotype; MHNC 13513, adult female (field number LM 637, Fig. 2 D–F; 3 C–D), Peru, Department of Cusco, Province Urubamba, District Machu Picchu, from Wiñaywayna ( $13^{\circ} 11' 33.72''$  S;  $72^{\circ} 32' 18.66''$  W), 2,800 m, collected by Luis Mamani, Kateryne Pino, Alexander Pari, Andres Garcia, and Gerardo Ceballos on 11 September 2012.

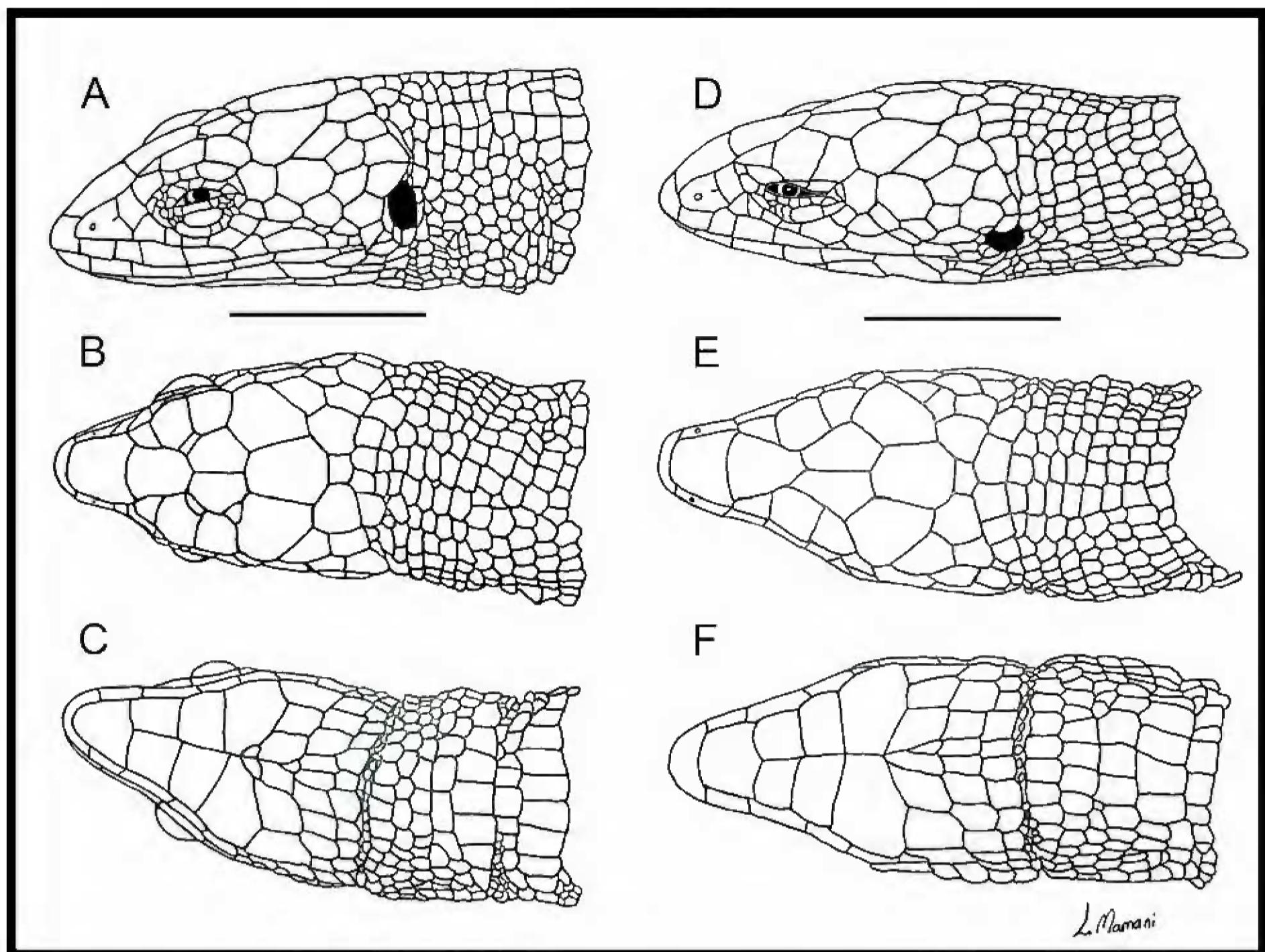
**Diagnosis:** (1) Frontonasal length equal to the frontal length; (2) nasoloreal suture present in all specimens; (3) Loreal scale present, not in contact with supralabials; (4) supraoculars three; (5) superciliaries four, first not expanded onto the dorsal surface of the head; (6) postoculars two; (7) palpebral disc made up of a single, undivided scale; (8) four supralabials anterior to the posteroventral angle of the subocular; (9) three pairs of genials in medial contact; (10) dorsal body scales quadrangular, keeled; (11) transverse rows of dorsals 38–39; (12) transverse ventral rows 21; (13) a continuous series of small lateral scales separating dorsals from ventrals; (14) posterior cloacal plate made up of six scales in both sexes; (15) anterior preanal plate scales paired; (16) femoral pores present or not in males, when present

six per hind limb (Fig. 3 G), absent in females; (17) preanal pores absent; (18) subdigital lamellae on toe IV 16–17; subdigital lamellae on finger V 10–11; (19) limbs overlapping when adpressed against body in adults; (20) limbs pentadactyl, digits clawed; (21) dorsal and lateral surfaces of head dark brown; lip irregularly yellow or orange-cream stripes; ventral surface of head and pregenual region cream or orange, with or without irregular black blotches; venter black or dark gray with cream or cream-orange spots on the posterior margin of some scales, in male juveniles is orange with black blotches.

All specimens of *Proctoporus machupicchu* have an undivided palpebral eye disc, a putative synapomorphy of the genus *Proctoporus* (Doan and Castoe 2005; Uzzell 1970). *Proctoporus machupicchu* can be distinguished from all other species of the genus, except for *P. iridescent*, by the presence of three pairs of genials in medial contact (two in all other species of *Proctoporus*). It can be distinguished from *P. iridescent* by having four supralabials anterior to the posteroventral angle of the subocular, by the presence of a loreal scale and a nasoloreal suture (three supralabials, loreal scale, and nasoloreal suture absent in *P. iridescent*). It can further be differentiated from *P. pachyurus* by having three supraoculars not fused with superciliaries (four supraoculars in *P. pachyurus*, first fused with first superciliary), and 38–39 transverse dorsal scale rows (47–60 in *P. pachyurus*); from *P. suculucus* by having a frontonasal scale equal in length to the frontal scale (frontonasal scale longer than the frontal scale in *P. suculucus*), and loreal scale not in contact with the supralabials (in contact in *P. suculucus*); from



**Fig. 1.** Holotype of *Proctoporus machupicchu* (MHNC 13362; SVL 41.2 mm).



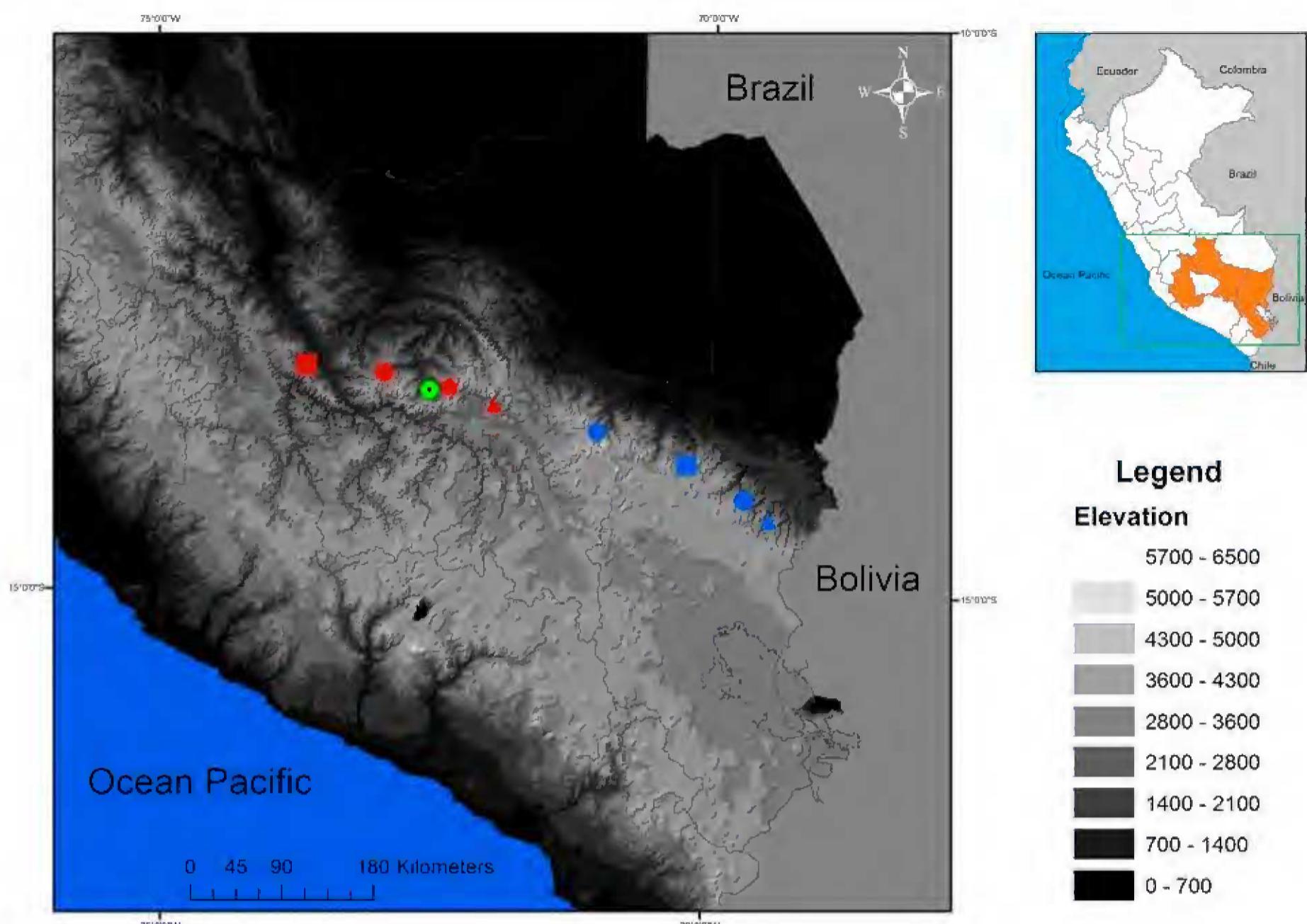
**Fig. 2.** (A, B, C) Head of the holotype of *Proctoporus machupicchu* (MHNC 13362), lateral, dorsal, and ventral view; and (D, E, F) Paratype (MHNC 13373) lateral, dorsal, and ventral view of the head. Scale bar 5 mm.

*P. bolivianus* by having frontonasal length equal to the frontal length (frontonasal longer than frontal scale in *P. bolivianus*); first supraciliary not fused with first supraocular (fused in *P. bolivianus*); from *P. unsaaca* and *P. guentheri* by the absence of a series of continuous lateral ocelli, loreal scale not in contact with supralabials, and the absence of a pair of enlarged preocular scales in contact (present in *P. unsaaca* and *P. guentheri*, loreal scale in contact with supralabials in *P. unsaaca* and a pair of enlarged preocular scales in medial contact in *P. siccilucu*); from *P. carabaya* and *P. kiziriani* by having a first supraocular not fused with the first supraciliary, (fused in *P. carabaya* and *P. kiziriani*) and limbs overlapping when adpressed against body (not overlapping in *P. carabaya* and *P. kiziriani*); from *P. lacertus* by having first supraocular not fused with the first supraciliary (fused in *P. lacertus*), and the presence of a loreal scale (absent in *P. lacertus*); from *P. xestus* by the lack of prefrontal scales (present in *P. xestus*) and the existence of keeled dorsal scales (smooth in *P. xestus*); and from *P. chasqui* by the lack of prefrontal scales (present in *P. chasqui*), supraoculars three (four in *P. chasqui*), and femoral pores absent in females (present in females of *P. chasqui*).

**Description of holotype:** Adult female, snout-vent length (SVL) 41.2 mm, tail length 60.8 mm; head scales smooth, rounded in dorsal and lateral view, without striations or rugosities; rostral scale wider (1.9 mm) than tall (0.9 mm), meeting the supralabials on either side at the top of the supralabials, becoming higher medially, in contact with frontonasal, nasals, and first supralabials; frontonasal longer than wide, equal in length with frontal, widest posteriorly, in contact with rostral, nasals, anterior most supraocular, and frontal; prefrontals absent; frontal longer than wide, roughly polygonal, not in contact with supraciliaries, in contact with frontonasal, first two supraoculars, and frontoparietals; frontoparietals polygonal (right scale divided on the right anterior side), in contact with frontal, second and third supraoculars, parietals, and interparietal; supraoculars three, middle scale divided on the posterior corner (in contact with frontoparietals on both sides), all in contact with supraciliaries, third in contact with frontoparietal, parietal, and postocular; interparietal longer than wide, polygonal, in contact with frontoparietals anteriorly, with parietals laterally, and with occipitals (or postparietals) posteriorly; parietals polygonal, lateral suture in contact with temporals and



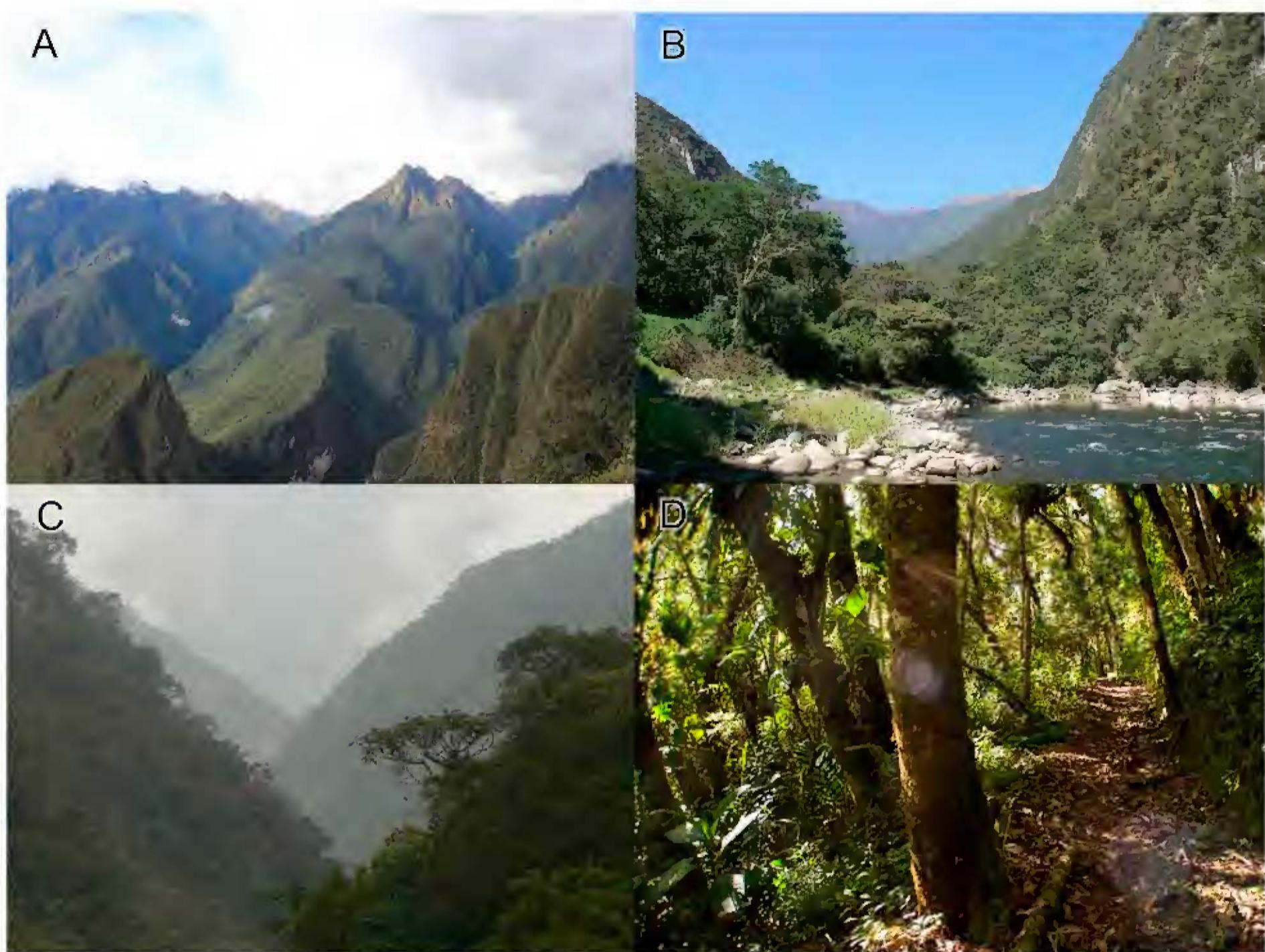
**Figure 3.** Dorsal and ventral views of living specimens of *Proctoporus machupicchu*. **A–B** adult female (MHNC 13362); **C–D** adult female (MHNC 13513); and **E–F** immature male (MHNC 13373); and **G** not collected of immature male showing femoral pores.



**Figure 4.** Map showing the distribution of *Proctoporus* species known from southeast of Peru, based on species listed in Appendix I and in Uzzell (1970), Doan and Castoe (2003), Doan et al. (2005), Chavez et al. (2011), and Goicoechea et al. (2013). Green circle, *Proctoporus machupicchu* sp. nov.; blue triangle, *P. boliviensis*; blue square, *P. carabaya*; red square, *P. chasqui*; blue circle, *P. iridescent*; blue pentagon, *P. kiziriani*; red circle, *P. lacertus*; red triangle, *P. unsaaca*; and red pentagon *P. suculucu*.

postoculars, diagonally with temporals, posteriorly with occipitals, anteriorly with third supraoculars and fronto-parietals; three occipitals, smaller than parietals, medial pentagonal, smaller than the laterals. Nasal divided, longer than high, in contact with first and second supralabials; loreal present, not in contact with the supralabials, in contact with nasal, first supraciliary, and frenocular; four supraciliaries, first not fused with the first supraocular; two preoculars, upper in contact with the first supraciliary and loreal scales, lower in contact with frenocular, and first subocular; frenocular roughly pentagonal, in contact with the second and third supralabials, lower preoculars, first subocular, and loreal scales; palpebral disc made up of a single transparent scale; three suboculars; two postoculars; temporals smooth, polygonal; four supralabials anterior to the posteroventral angle of the suboculars. Mental wider (1.9 mm) than long (1.05 mm), in contact with the first infralabial and postmental posteriorly; postmental single, pentagonal, in contact with the first infralabials and the first pair of genials; three pairs of genials in medial contact, anterior pair in contact with the first and second infralabials on the right side and in contact with the second on the left side; second pair of genials in contact with the second and third infralabials; third pair of genials in contact with the third

and fourth infralabials laterally; one pair of chin shields, separated by four smaller median pregulars; eight gular scale rows; small lateral neck scales, round and smooth. Dorsal scales rectangular, longer than wide, juxtaposed, slightly keeled, in thirty-nine transverse rows; twenty-three longitudinal dorsal scale rows at midbody; continuous lateral scale series, smaller than dorsals, and partially hidden in lateral fold; reduced scales at limb insertion regions present; twenty-two transverse ventral scale rows; ten longitudinal ventral scale rows at midbody; anterior preanal plate scales paired; six posterior preanal plate scales, lateralmost scales small; scales on the tail rectangular (fewer square), juxtaposed; dorsal and dorsolateral caudal scales slightly keeled anteriorly, smooth posteriorly; ventrolateral caudal scales smooth; midventral subcaudal scales wider than the adjacent scales, almost square, anteriormost midventral subcaudal scales subimbricate. Limbs pentadactyl; digits clawed; dorsal brachial scales polygonal, subequal in size, subimbricate, smooth; roundish ventral brachial scales, subimbricate, smooth; dorsal antebrachial scales polygonal, subequal in size, smooth; ventral antebrachial scales polygonal, smaller than dorsals; dorsal manus scales polygonal, smooth, subimbricate and arranged in three rows; palmar scales small, rounded, and juxtaposed, domelike; dorsal scales



**Figure 5.** Type locality of *Proctoporus machupicchu*: (A, C) Montane forest, (B) Urubamba River, (D) Habitat of *Proctoporus machupicchu*. Photo: (6 A–C) Luis Mamani; 6 D (Javier Farfan).

on fingers smooth, quadrangular, covering dorsal half of digit, and overhanging subdigital scales, two on finger I, four on II, six on III, six on IV, and four on V; scales on anterodorsal surface of thigh polygonal, smooth, subimbricate; scales on posterior surface of thigh small, rounded, and juxtaposed; scales on ventral surface of thigh small, enlarged, and smooth; femoral pores absent; preanal pores absent; scales on anterior surface of crus polygonal, smooth, juxtaposed, decreasing in size distally; scales on anterodorsal surface of crus rounded, juxtaposed; scales on ventral surface of crus polygonal, enlarged, smooth, flat, and subimbricate; scales on dorsal surface of toes polygonal, smooth; overhanging supradigital lamellae, two on toe I, five on II, nine on III, twelve on IV, seven on V; subdigital lamellae single, four on toe I, eight on II, eleven on III, sixteen on IV, ten on V; limbs overlapping when adpressed against the body.

**Coloration in preservative:** Dorsal and lateral surfaces of head dark brown; ventral surface of head cream with clusters of light and dark brown, and scales with black spots inside. Gular region similar to the head, the macules in anterior side are light brown and diffuse, on posterior side are thick. Lip irregularly barred with cream

coloring. Dorsal surface of the trunk same color as head. Lateral surface of trunk of the same coloration as dorsum, fading to paler brown near venter. Ventral surface of the trunk black with cream spots at posterior margin of each scale. Color of limbs similar to body. Dorsal tail coloration like that of body; ventral surface of tail dark brown with cream spots.

**Coloration in life:** The coloration is similar to that in preservative, but with orange spots along the ventral surface of the body.

**Variation:** Scalation and morphometrics of the paratypes are similar to the holotype (Table 1). The coloration in females is variable, the ventral surface of the head and gular region are orange and pale yellow with brown and black spots. In the sub-adult male the coloration in the ventral surface of the head and gular region is an intense orange and extends posteriorly to the ventral surface of the trunk.

**Etymology:** The specific epithet is an indeclinable word that refers to the distribution of the new species in the Natural Protected Area of the Historic Sanctuary of Ma-

chu Picchu, in the Cordillera of Vilcanota, one of the most important formations in the Andes of southern Peru.

**Distribution:** *Proctoporus machupicchu* is known only from Aobamba (type locality), and Wiñaywayna, both inside the Historic Sanctuary of Machu Picchu between 2,760–2,800 m (Fig. 4). With the addition of the new species, the genus *Proctoporus* contains 12 species from Peru; six of them (*Proctoporus guentheri*, *P. kiziriani*, *P. lacertus*, *P. machupicchu* sp. nov., *P. unsaaca*, *P. suculucu*) located in the Department of Cusco.

**Habitat and ecology:** Individuals were found during the day under rocks in the montane forest, of the eastern slope, of the Cordillera Oriental of the Andes (Fig. 5).

**Conservation:** The status of this species is unknown. More herpetological surveys and population studies are needed to adequately assess its status.

## Discussion

Similarities in morphology and coloration would place *P. machupicchu* closer to *P. guentheri* and *P. unsaaca*, but further incorporation of DNA sequences and morphological data should provide a better resolution to the position of this new species within *Proctoporus*. Although

the description of *P. machupicchu* represents an increase in the species richness within *Proctoporus*, the knowledge of the actual species diversity of the genus is still limited (Doan and Castoe 2003; Goicoechea et al. 2012) and some taxonomic problems still remain to be solved. Some authors (Goicoechea et al. 2012; Chávez et al. 2011; Köhler and Lehr 2004) have related Peruvian species of *Euspondylus* (*E. caideni* Köhler, *E. josyi* Köhler, *E. nellycarrillae* Köhler and Lehr, *E. oreades* Chávez, Siu-Ting, Durán, and Venegas, *E. rahmi* (De Grijs), *E. simonsii* Boulenger, and *E. spinalis* (Boulenger) with *Proctoporus*. These species are found along central and southern Peru, overlapping with the distribution of *Proctoporus* and share with *Proctoporus* several derived features including the presence of an undivided palpebral eye disc. Recently, Goicoechea et al. (2012) found molecular evidence to place a species of *Euspondylus*, *E. chasqui* within *Proctoporus*, nevertheless, the phylogenetic relationships of the remaining species of Peruvian *Euspondylus* and *Proctoporus* remains uncertain. On the other hand, an additional species of *Proctoporus*, *P. cephalolineatus*, presumably exist in Venezuela. This species was previously described as belonging to the *Proctoporus luctuosus* group (García-Perez and Yustiz, 1995). Nevertheless, because the holotype and unique specimen of this species has limbs that do not overlap when adpressed, Doan and Schargel (2003) removed *P. cephalolineatus* from the *P. luctuosus* group and related

## Revised key to the genus *Proctoporus*

Key to the Species of *Proctoporus* from Perú, Bolivia, and Argentina (adapted from Goicoechea, Padial, Chaparro, Castroviejo-Fisher, and De la Riva 2013)

1a. Presence of prefrontals.....	2
1b. Absence of prefrontal scales.....	3
2a. Smooth dorsal scales, single large elongate subocular, presence of large spines at the base of the sulcus spermaticus.....	<i>P. xestus</i>
2b. Keeled dorsal scales, several small subocular scales.....	<i>P. chasqui</i>
3a. Two pair of genial in contact.....	5
3b. Three pair of genial in contact.....	4
4a. Three supralabials anterior to the posteroventral angle of the subocular.....	<i>P. iridesces</i>
4b. Four supralabials anterior to the posteroventral angle of the subocular.....	<i>P. machupicchu</i>
5a. Two to three supraoculars.....	6
5b. Four supraoculars.....	<i>P. pachyurus</i>
6a. Venter uniformly dark or with dark stippling or mottling near lateral scale rows.....	7
6b. Venter clear yellow or orange without dark mottling.....	<i>P. guentheri</i>
7a. No continuous series of lateral ocelli.....	8
7b. Continuous series of lateral ocelli.....	<i>P. unsaaca</i>
8a. Frontonasal scale longer than frontal scale.....	9
8b. Frontonasal scale equal in length to frontal scale.....	10
9a. Limbs overlapping when adpressed.....	<i>P. suculucu</i>
9b. Limbs not overlapping when adpressed.....	<i>P. bolivianus</i>
10a. First supraocular not fused with first superciliary.....	11
10b. First supraocular fused with first superciliary.....	<i>P. carabaya</i>
11a. Absence of loreal scale.....	<i>P. lacertus</i>
11b. Presence of loreal scale.....	<i>P. kiziriani</i>

this species with *Euspondylus* and *Pholidobolus* based on the presence of prefrontals in *P. cephalolineatus* (a character presumed not to be present in *Proctoporus* at this time). This species shows the presence of palpebral eye-disc divided vertically (J.E. García-Perez, pers. comm.). As the presence of an undivided palpebral eye disc is a diagnostic character for the genus *Proctoporus* (Doan and Castoe 2005; Goicoechea et al. 2012; 2013) we believe that this species does not belong to this genus. Further studies based on molecular and morphological data are necessary to cast some light on these topics, as well as on the relationships of *P. machupicchu* with other species in the genus.

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## Literature Cited

Boettger O. 1891. Reptilien und Batrachier aus Bolivien. *Zoologischer Anzeiger* 14: 343–347.

Boulenger GA. 1885. *Catalogue of the Lizards in the British Museum (Natural History) I–III*. London, United Kingdom.

Chávez G, Siu-Ting K, Durán V, Venegas PJ. 2011. Two new species of Andean gymnophthalmid lizards of the genus *Euspondylus* (Reptilia, Squamata) from central and southern Peru. *ZooKeys* 109: 1–17.

Doan TM, Castoe TA. 2003. Using morphological and molecular evidence to infer species boundaries within *Proctoporus bolivianus* Werner (Squamata: Gymnophthalmidae). *Herpetologica* 59: 433–450.

Doan TM, Schargel WE. 2003. Bridging the gap in *Proctoporus* distribution: A new species (Squamata: Gymnophthalmidae) from the Andes of Venezuela. *Herpetologica* 59(1): 68–75.

Doan TM, Castoe TA. 2005. Phylogenetic taxonomy of the Cercosaurini (Squamata: Gymnophthalmidae), with new genera for species of *Neusticurus* and *Proctoporus*. *Zoological Journal of the Linnean Society* 145: 403–416.

Doan TM, Castoe TA, Arizábal-Arriaga W. 2005. Phylogenetic relationships of the genus *Proctoporus* sensu stricto (Squamata: Gymnophthalmidae), with a new species from Puno, southeastern Peru. *Herpetologica* 61: 325–336.

Garcia-Perez JE, Yustiz EE. 1995. Una nueva especie de *Proctoporus* (Sauria: Gymnophthalmidae) de los Andes de Venezuela. *Revista de Ecología Latinoamericana* 4: 1–5

Goicoechea N, Padial JM, Chaparro JC, Castroviejo-Fisher S, De la Riva I. 2012. Molecular phylogenetics, species delimitation and biogeography of the Andean lizards of the genus *Proctoporus* (Squamata: Gymnophthalmidae). *Molecular Phylogenetics and Evolution* 65: 953–964.

Goicoechea N, Padial JM, Chaparro JC, Castroviejo-Fisher S, De la Riva, I. 2013. A taxonomic revision of *Proctoporus bolivianus* Werner (Squamata: Gymnophthalmidae) with the description of three new species and resurrection of *Proctoporus lacertus* Stejneger. *American Museum Novitates* 3786: 1–32.

Kizirian DA. 1996. A review of Ecuadorian *Proctoporus* (Squamata: Gymnophthalmidae) with descriptions of nine new species. *Herpetological Monographs* 10: 85–155.

Köhler G, Lehr E. 2004. Comments on *Euspondylus* and *Proctoporus* (Squamata: Gymnophthalmidae) from Peru, with the description of three new species and a key to the Peruvian species. *Herpetologica* 60: 101–118.

Stejneger L. 1913. Results of the Yale Peruvian Expedition of 1911. Batrachians and Reptiles. *Proceedings of the United States National Museum* 45: 541–547.

Tschudi JJ. 1845. Reptilium conspectum quae in republika Peruana reperiuntur et pleraque observata vel collecta sunt in itenere. *Archiv für Naturgeschichte* 11(1): 150–170.

Uzzell TM. 1969. A new genus and species of Teiid lizard from Bolivia. *Postilla* 129: 1–15.

Uzzell TM. 1970. Teiid lizards of the genus *Proctoporus* from Bolivia and Peru. *Postilla* 142: 1–39.

## Appendix 1

Specimens Examined. Museum acronyms refer to: AMNH, American Museum of Natural History, New York, USA; CBF, Colección Boliviana de Fauna, La Paz, Bolivia; MHNC, Museo de Historia Natural, Cusco, Peru; MNCN, Museo Nacional de Ciencias Naturales, Madrid, Spain; USNM, Smithsonian Institution, National Museum of Natural History, Washington, USA; UTA, University of Texas, Arlington, USA. Numbers in brackets represents the original field numbers.

### *Proctoporus boliviensis*

PERU: Puno: Sandia (UTA 52946–47 [TMD 01267, TMD 01271]); Cuyo-Cuyo (MHNC5333 [MNCN 4532], MHNC 5348–49 [MNCN 4566, MNCN 4568], MNCN 43660–62 [MNCN 4531, MNCN 4534, MNCN 4567]); Patambuco (MHNC 5357 [MNCN 5357], MNCN 43663–64 [MNCN 4583, MNCN 4584]); BOLIVIA: La Paz: Pelechuco (MNCN 43655–56 [MNCN 4143, MNCN 4142]); Millipalla, 12 km S of Sorata (CBF 3437–39 [MNCN 4729, MNCN 4731, MNCN 4733], MNCN 43678–79 [MNCN 4730, MNCN 4732]); Charazani (CBF 2329 [MNCN 4159]); Caalaya (CBF 2330 [MNCN 4162]).

### *Proctoporus chasqui*

PERU: Ayacucho: Road between Abra Tapuna and San Francisco (MNCN 44407–08 [MNCN 4830, MNCN 4831]).

### *Proctoporus carabaya*

Perú: Puno: Carabaya (MHNC 5428 [holotype: MNCN 4709], MHNC 5429–31 [paratypes: MNCN 4710, 4714, 4715]).

### *Proctoporus guentheri*

PERU: Cusco: Urubamba (UTA 55366–67 [TMD 01322, TMD 01324]); Paucartambo (USNM 346179 [USNM 206266]); BOLIVIA: La Paz: Apolo (USNM 336148 [USNM 107286]).

### *Proctoporus iridescentis*

Perú: Puno: Sandia: Limbani (MHNC 5359 [holotype: MNCN 4590]), MHNC 5361 [paratype: MNCN 4593]); Puno: Carabaya (MHNC 5699, MHNC 5701 [paratypes: MNCN 4793, 4795]).

### *Proctoporus kiziriani*

Perú: Cusco: Quispicanchi (MHNC 5366 [holotype: MNCN 4602]), MHNC 5680, MHNC 5682–83, MHNC 5685 [paratypes: MNCN 4750, 4751–4752, 4754]).

### *Proctoporus lacertus*

PERU: La Convención: Tincochaca (USNM 49551 [holotype], 49552 [paratype]); Calca (UTA 55315–23 [TMD 01301, TMD 01307, TMD 01309, TMD 01310, TMD 01311, TMD 01312, TMD 01313, TMD 01316, TMD 01317], USNM 298685–90 [JEC 6264, JEC 6265, JEC 6266, JEC 6267, JEC 6268, JEC 6269]); Ollantaytambo (USNM 49549 [paratype], USNM 107649); Nusta Hispana (USNM 60699); Torontoy (USNM 60726); Paucartambo (AMNH 142921 [AMNH11568]).

### *Proctoporus pachyurus*

PERU: Junín: Cerro San Cristóbal (MHNC 4693–94 [TA504, TA505], MHNC 4696 [TA507]); Tarma (UTA 55267–72 [TMD 01211, 01213, TMD 01214, TMD 01215, TMD 01216, TMD 01220], UTA 55314 [TMD 01195]); Palca (USNM 299581–82 [JEC 7092, JEC 7093]).

### *Proctoporus succulucus*

PERU: Apurímac: Abancay (UTA 52950 [TMD 01146], UTA 55273–78 [TMD 01140, TMD 01141, TMD 01143, TMD 01144, TMD 01157, TMD 01159]); Cusco: Quillabamba (USNM 298632–33 [JEC 6093, JEC 6094]); Puno: Ollachea (USNM 299125–27 [JEC 6591, JEC 6592, JEC 6593]); Ayacucho, Anco (MNCN 44474–82 [MNCN 5012, MNCN 5013, MNCN 5014, MNCN 5015, MNCN 5016, MNCN 5017, MNCN 5018, MNCN 5019, MNCN 5020]).

### *Proctoporus unsaaca*

PERU: Urubamba (UTA 55289–90 [TMD 01031, TMD 01032], UTA 55291–92 [TMD 01033, TMD 01035], UTA 55294–95 [TMD 01094, TMD 1037, TMD 01094]).

### *Proctoporus xestus*

BOLIVIA: (AMNH 22740–41); Cochabamba (AMNH 38957–62).



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In accordance with the International Code of Zoological Nomenclature new rules and regulations (ICZN 2012), we have deposited this paper in publicly accessible institutional libraries. The new species described herein has been registered in ZooBank (Polaszek 2005a, b), the official online registration system for the ICZN. The ZooBank publication LSID (Life Science Identifier) for the new species described here can be viewed through any standard web browser by appending the LSID to the prefix "<http://zoobank.org/>." The LSID for this publication is: urn:lsid:zoobank.org:pub:ADEEE69A-964E-491F-93A8-EA7F4FE5303D.

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#### Citations

ICZN. 2012. Amendment of Articles 8,9,10,21 and 78 of the International Code of Zoological Nomenclature to expand and refine methods of publication. *Zootaxa* 3450: 1–7.

Polaszek A et al. 2005a. Commentary: A universal register for animal names. *Nature* 437: 477.

Polaszek A et al. 2005b. ZooBank: The open-access register for zoological taxonomy: Technical Discussion Paper. *Bulletin of Zoological Nomenclature* 62(4): 210–220.